DRAFT

Geometry EOC Test Item Specifications

INTENDED FOR TEST ITEM WRITERS AND REVIEWERS FOR FLORIDA'S STATEWIDE ASSESSMENTS. NOT FOR INSTRUCTIONAL USE.

The contents of these draft *Test Item Specifications (Specifications)* are based on the benchmarks provided in Florida's Benchmarks for Excellent Student Thinking (B.E.S.T.) Standards. The *Specifications* define the content and format of the tests and test items and indicate the alignment of items with the benchmarks for test item writers and reviewers. **The *Specifications* are not intended for instructional use.**

With the adoption of Florida's B.E.S.T. Standards for ELA and Mathematics, the following comprehensive resource has been developed to support educators.

- Within the standards, **benchmark clarifications** provide helpful information for educators to understand and implement each standard.

Given the availability of B.E.S.T. resources and to prevent any misuse of the *Specifications* by educators, item specifications for ELA and Mathematics assessments aligned to the B.E.S.T. Standards will be reserved for their intended purpose of guiding item writers and reviewers. B.E.S.T. Standards implementation should be driven by the instructional support provided by the Just Read, Florida! (JRF) Office and the Bureau of Standards and Instructional Support (BSIS) to ensure that the focus remains on the content and skills students will engage with in the classroom.

Origin of the Specifications

The Florida Department of Education convened committees of Florida educators to help develop and approve the specifications documents.

Item Type Descriptions

The Florida B.E.S.T. Standards Assessments are composed of test items that include traditional multiple-choice items as well as technology-enhanced items that require students to select and/or support their answers.

The various item types are described below.

- **Technology-Enhanced Item Types—Mathematics**
  - **Editing Task Choice**—The student clicks a drop-down menu containing options to complete an equation or expression, a statement, or other component. The student then selects the correct response from the drop-down menu. For paper-based assessments, this item type is modified; the student fills in a bubble to indicate a selection.
  - **Selectable Hot Text**—The student is directed to click on one or more correct answers from among a number of options. When the student hovers over the options (e.g., phrases, sentences, numbers, or expressions), the text will highlight. This indicates that the text is selectable ("hot"). The options may be presented in various ways (e.g., as a list, embedded within text, or in a table). The student can then click on an option to select it. For paper-based assessments, this item type is modified; the student fills in a bubble to indicate a selection.
  - **Multiselect**—The student is directed to select all the correct answers from among a number of options. These items are different from Multiple Choice items, which allow the student to select only one correct answer. These items appear in the online and paper-based assessments.
  - **Graphic Response Item Display (GRID)**—The student uses the point, line, or arrow tools to create a response on a graph. The item type may also require the student to select numbers, words, phrases, or images and use the drag-and-drop feature to place them into a graphic. For paper-based assessments, this item type will be replaced with another item type.
  - **Equation Editor**—The student enters a number, variable, expression, or equation, as appropriate to the test item, in a response box. The student is presented with a toolbar that includes a variety of mathematical symbols that can be used to create a response. The response box may be separate from the text of the item, or it may be embedded within text of the item (e.g., in line with a sentence or within a table). For paper-based assessments, this item type is modified; the student writes a response in the response box.
  - **Matching Item**—The student checks a box to indicate whether information from a column header matches information from a row. The number of correct answer options per row or column may vary. These items appear in the online and paper-based assessments.

Any of the item types may be combined into a single item with multiple parts called a multi-interaction item. The student will interact with different item types within a single item. Each part could be a different item type. For paper-based assessments, different item types (multiple choice, multiselect, editing task choice, selectable hot text, matching, and equation editor) may be combined into a single item.

Item Specifications Definitions

- **Assessment Limits** define the range of content knowledge and degree of difficulty that should be assessed in the assessment items for the benchmark(s).
- **Also Assesses**—Where mastery of overlapping mathematical skills of associated benchmark(s) could be assessed through primary benchmark(s).
- **Calculator Availability**
  The following chart displays the type of calculator available for each grade or course B.E.S.T. Assessment. Note: For grades 6, 7, 8, Algebra 1, and Geometry, calculators are available for the entire assessment.

Grade/Course	Calculator
3, 4, 5	None
6	Four-function
7, 8	Desmos scientific
Algebra 1, Geometry	Desmos scientific

  - **Calculator Designations**
    - **None**—Items for this benchmark **may not** allow for the availability of a calculator.
    - **Available**—Items for this benchmark **must** allow for the availability of a calculator.

- **Context Designations**
  Any item could include justifying and error analysis through reasoning.
  - **Real-world**—authentic application of mathematics to real-world situations
  - **Mathematical**—using models, equations, or evaluation of mathematical reasoning in the absence of a real-world context
  - **Both**—Items could either use a real-world context or be strictly mathematical.

Logic, Relationships, and Theorems

MA.912.GR.1	***Prove and apply geometric theorems to solve problems.***
MA.912.GR.1.1	Prove relationships and theorems about lines and angles. Solve mathematical and real-world problems involving postulates, relationships and theorems of lines and angles.
Benchmark Clarifications	*Clarification 1:* Postulates, relationships and theorems include vertical angles are congruent; when a transversal crosses parallel lines, the consecutive angles are supplementary and alternate (interior and exterior) angles and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints. *Clarification 2:* Instruction includes constructing two-column proofs, pictorial proofs, paragraph and narrative proofs, flow chart proofs or informal proofs. *Clarification 3:* Instruction focuses on helping a student choose a method they can use reliably.
Context	Both
Calculator	Available
Assessment Limits	Items will not assess postulates, relationships, and theorems beyond *Clarification 1*. Items requiring the student to solve problems involving vertical angles must include real-world context and/or the use of multiple angle relationships. Items will not require the student to identify a reason using/recognizing the formal name of a theorem/postulate/relationship unless referenced in the benchmark or clarifications. Items may include multiple sets of lines and angles.

MA.912.GR.1	***Prove and apply geometric theorems to solve problems.***
MA.912.GR.1.2	Prove triangle congruence or similarity using Side-Side-Side, Side-Angle-Side, Angle-Side-Angle, Angle-Angle-Side, Angle-Angle and Hypotenuse-Leg.
Benchmark Clarifications	*Clarification 1:* Instruction includes constructing two-column proofs, pictorial proofs, paragraph and narrative proofs, flow chart proofs or informal proofs. *Clarification 2:* Instruction focuses on helping a student choose a method they can use reliably.
Context	Mathematical
Calculator	Available
Assessment Limits	Items will not require the student to identify a reason using/recognizing the formal name of a theorem/postulate/relationship unless referenced in the benchmark or clarifications.

MA.912.GR.1	***Prove and apply geometric theorems to solve problems.***
MA.912.GR.1.3	Prove relationships and theorems about triangles. Solve mathematical and real-world problems involving postulates, relationships and theorems of triangles.
Benchmark Clarifications	*Clarification 1:* Postulates, relationships and theorems include measures of interior angles of a triangle sum to 180°; measures of a set of exterior angles of a triangle sum to 360°; triangle inequality theorem; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. *Clarification 2:* Instruction includes constructing two-column proofs, pictorial proofs, paragraph and narrative proofs, flow chart proofs or informal proofs. *Clarification 3:* Instruction focuses on helping a student choose a method they can use reliably.
Context	Both
Calculator	Available
Assessment Limits	Items will not assess postulates, relationships, and theorems beyond *Clarification 1*. Items may use geometric figures of any shape if the figure can be decomposed into a triangle or triangles. Items will not require the student to identify a reason using/recognizing the formal name of a theorem/postulate/relationship unless referenced in the benchmark or clarifications. Other than the triangle inequality theorem, items requiring the student to identify a reason will not require the student to recognize the formal name of theorems or postulates.

MA.912.GR.1	***Prove and apply geometric theorems to solve problems.***
MA.912.GR.1.4	Prove relationships and theorems about parallelograms. Solve mathematical and real-world problems involving postulates, relationships and theorems of parallelograms.
Benchmark Clarifications	*Clarification 1:* Postulates, relationships and theorems include opposite sides are congruent, consecutive angles are supplementary, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and rectangles are parallelograms with congruent diagonals. *Clarification 2:* Instruction includes constructing two-column proofs, pictorial proofs, paragraph and narrative proofs, flow chart proofs or informal proofs. *Clarification 3:* Instruction focuses on helping a student choose a method they can use reliably.
Context	Both
Calculator	Available
Assessment Limits	Items will not assess postulates, relationships, and theorems beyond *Clarification 1*. Items will not require the student to identify a reason using/recognizing the formal name of a theorem/postulate/relationship unless referenced in the benchmark or clarifications.

MA.912.GR.1	***Prove and apply geometric theorems to solve problems.***
MA.912.GR.1.5	Prove relationships and theorems about trapezoids. Solve mathematical and real-world problems involving postulates, relationships and theorems of trapezoids.
Benchmark Clarifications	*Clarification 1:* Postulates, relationships and theorems include the Trapezoid Midsegment Theorem and for isosceles trapezoids: base angles are congruent, opposite angles are supplementary and diagonals are congruent. *Clarification 2:* Instruction includes constructing two-column proofs, pictorial proofs, paragraph and narrative proofs, flow chart proofs or informal proofs. *Clarification 3:* Instruction focuses on helping a student choose a method they can use reliably.
Context	Both
Calculator	Available
Assessment Limits	Items will not assess postulates, relationships, and theorems beyond *Clarification 1*. Items will not require the student to identify a reason using/recognizing the formal name of a theorem/postulate/relationship unless referenced in the benchmark or clarifications.

MA.912.GR.6	***Use properties and theorems related to circles.***
MA.912.GR.6.1	Solve mathematical and real-world problems involving the length of a secant, tangent, segment or chord in a given circle.
Benchmark Clarifications	*Clarification 1:* Problems include relationships between two chords; two secants; a secant and a tangent; and the length of the tangent from a point to a circle.
Context	Both
Calculator	Available
Assessment Limits	Items will not assess relationships beyond *Clarification 1*. Angle measures will be in degrees.

MA.912.GR.6	***Use properties and theorems related to circles.***
MA.912.GR.6.2	Solve mathematical and real-world problems involving the measures of arcs and related angles.
Benchmark Clarifications	*Clarification 1:* Within the Geometry course, problems are limited to relationships between inscribed angles; central angles; and angles formed by the following intersections: a tangent and a secant through the center, two tangents, and a chord and its perpendicular bisector.
Context	Both
Calculator	Available
Assessment Limits	Angle measures will be in degrees.

MA.912.GR.6	***Use properties and theorems related to circles.***
MA.912.GR.6.3	Solve mathematical problems involving triangles and quadrilaterals inscribed in a circle.
Benchmark Clarifications	*Clarification 1:* Instruction includes cases in which a triangle inscribed in a circle has a side that is the diameter.
Context	Mathematical
Calculator	Available
Assessment Limits	Angle measures will be in degrees.

MA.912.GR.6	***Use properties and theorems related to circles.***
MA.912.GR.6.4	Solve mathematical and real-world problems involving the arc length and area of a sector in a given circle.
Benchmark Clarifications	*Clarification 1:* Instruction focuses on the conceptual understanding that for a given angle measure the length of the intercepted arc is proportional to the radius, and for a given radius the length of the intercepted arc is proportional is the angle measure.
Context	Both
Calculator	Available
Assessment Limits	Angle measures will be in degrees.

MA.912.LT.4	***Develop an understanding of the fundamentals of propositional logic, arguments and methods of proof.***
MA.912.LT.4.3	Identify and accurately interpret "if…then," "if and only if," "all" and "not" statements. Find the converse, inverse and contrapositive of a statement.
Benchmark Clarifications	*Clarification 1:* Instruction focuses on recognizing the relationships between an "if…then" statement and the converse, inverse and contrapositive of that statement. *Clarification 2:* Within the Geometry course, instruction focuses on the connection to proofs within the course.
Context	Both
Calculator	Available
Assessment Limits	Items will not assess truth tables. Statements will reference postulates, relationships, and theorems from MA.912.GR.1.

MA.912.LT.4	***Develop an understanding of the fundamentals of propositional logic, arguments and methods of proof.***
MA.912.LT.4.10	Judge the validity of arguments and give counterexamples to disprove statements.
Benchmark Clarifications	*Clarification 1:* Within the Geometry course, instruction focuses on the connection to proofs within the course.
Context	Both
Calculator	Available
Assessment Limits	Statements will reference postulates, relationships, and theorems from MA.912.GR.1.

Congruence, Similarity, and Constructions

MA.912.GR.1	***Prove and apply geometric theorems to solve problems.***
MA.912.GR.1.6	Solve mathematical and real-world problems involving congruence or similarity in two-dimensional figures.
Benchmark Clarifications	*Clarification 1:* Instruction includes demonstrating that two-dimensional figures are congruent or similar based on given information.
Context	Both
Calculator	Available
Assessment Limits	Items should not give a scale factor or assess finding a scale factor between two similar figures. Items must use figures other than two triangles when assessing similar figures. Items must use closed figures when assessing congruent and/or similar figures.

MA.912.GR.2	***Apply properties of transformations to describe congruence or similarity.***
MA.912.GR.2.1	Given a preimage and image, describe the transformation and represent the transformation algebraically using coordinates. *Example:* Given a triangle whose vertices have the coordinates $(-3, 4)$, $(2, 1.7)$ and $(-0.4, -3)$. If this triangle is reflected across the y-axis the transformation can be described using coordinates as $(x, y) \rightarrow (-x, y)$ resulting in the image whose vertices have the coordinates $(3, 4)$, $(-2, 1.7)$, and $(0.4, -3)$.
Benchmark Clarifications	*Clarification 1:* Instruction includes the connection of transformations to functions that take points in the plane as inputs and give other points in the plane as outputs. *Clarification 2:* Transformations include translations, dilations, rotations and reflections described using words or using coordinates. *Clarification 3:* Within the Geometry course, rotations are limited to 90°, 180° and 270° counterclockwise or clockwise about the center of rotation, and the centers of rotations and dilations are limited to the origin or a point on the figure.
Context	Mathematical
Calculator	Available
Assessment Limits	Items will not assess transformations beyond *Clarification 2*. Items involving a reflection across a line will include the equation written in the form $y = a$, $x = a$, $y = x$, or $y = -x$, where a is an integer. Items will use coordinate notation having algebraic descriptors for representing transformations. Items will not use function notation for representing transformations. Items should reference an image and its pre-image and are limited to a single transformation or a sequence of two to four transformations.

MA.912.GR.2	***Apply properties of transformations to describe congruence or similarity.***
MA.912.GR.2.2	Identify transformations that do or do not preserve distance.
Benchmark Clarifications	*Clarification 1:* Transformations include translations, dilations, rotations and reflections described using words or using coordinates. *Clarification 2:* Instruction includes recognizing that these transformations preserve angle measure.
Context	Mathematical
Calculator	Available
Assessment Limits	Items will not assess transformations beyond *Clarification 1*.

MA.912.GR.2	***Apply properties of transformations to describe congruence or similarity.***
MA.912.GR.2.3	Identify a sequence of transformations that will map a given figure onto itself or onto another congruent or similar figure.
Benchmark Clarifications	*Clarification 1:* Transformations include translations, dilations, rotations and reflections described using words or using coordinates. *Clarification 2:* Within the Geometry course, figures are limited to triangles and quadrilaterals and rotations are limited to 90°, 180° and 270° counterclockwise or clockwise about the center of rotation. *Clarification 3*: Instruction includes the understanding that when a figure is mapped onto itself using a reflection, it occurs over a line of symmetry.
Also Assesses	
MA.912.GR.2.6	Apply rigid transformations to map one figure onto another to justify that the two figures are congruent.
Benchmark Clarifications	*Clarification 1:* Instruction includes showing that the corresponding sides and the corresponding angles are congruent.
MA.912.GR.2.8	Apply an appropriate transformation to map one figure onto another to justify that the two figures are similar.
Benchmark Clarifications	*Clarification 1:* Instruction includes showing that the corresponding sides are proportional, and the corresponding angles are congruent.
Context	Mathematical
Calculator	Available
Assessment Limits	Items will not assess transformations beyond *Clarification 1*. Items may include the use of words or coordinate notation using algebraic descriptors for describing the transformation(s). Items should reference two different figures and are limited to a single transformation or a sequence of two to four transformations. Items may include rigid transformations of circles.

MA.912.GR.2	***Apply properties of transformations to describe congruence or similarity.***
MA.912.GR.2.5	Given a geometric figure and a sequence of transformations, draw the transformed figure on a coordinate plane.
Benchmark Clarifications	*Clarification 1:* Transformations include translations, dilations, rotations and reflections described using words or using coordinates. *Clarification 2*: Instruction includes two or more transformations.
Context	Mathematical
Calculator	Available
Assessment Limits	Items will not assess transformations beyond *Clarification 1*. Items are limited to a sequence of two to four transformations. Items may include the use of words or coordinate notation using algebraic descriptors for describing the transformations. Items may include identifying coordinate pairs of vertices of transformed figures.

MA.912.GR.4	***Use geometric measurement and dimensions to solve problems.***
MA.912.GR.4.3	Extend previous understanding of scale drawings and scale factors to determine how dilations affect the area of two-dimensional figures and the surface area or volume of three-dimensional figures. *Example:* Mike is having a graduation party and wants to make sure he has enough pizza. Which option would provide more pizza for his guests: one 12-inch pizza or three 6-inch pizzas?
Context	Both
Calculator	Available
Assessment Limits	Items that require the student to find the volume or surface area of a dilated figure must give the volume or surface area of the original figure.

MA.912.GR.5	***Make formal geometric constructions with a variety of tools and methods.***
MA.912.GR.5.1	Construct a copy of a segment or an angle.
Benchmark Clarifications	*Clarification 1:* Instruction includes using compass and straightedge, string, reflective devices, paper folding or dynamic geometric software.
Context	Mathematical
Calculator	Available
Assessment Limits	Items will assess constructions through the use of compass and straight-edge with descriptions, images, and/or animations. Items must use straightedge and compass vocabulary when referencing tools. Items may ask the student to describe steps in a construction, identify the next step in a given construction, or describe what construction is being created.

MA.912.GR.5	***Make formal geometric constructions with a variety of tools and methods.***
MA.912.GR.5.2	Construct the bisector of a segment or an angle, including the perpendicular bisector of a line segment.
Benchmark Clarifications	*Clarification 1:* Instruction includes using compass and straightedge, string, reflective devices, paper folding or dynamic geometric software.
Context	Mathematical
Calculator	Available
Assessment Limits	Items will assess constructions through the use of compass and straight-edge with descriptions, images, and/or animations. Items must use straightedge and compass vocabulary when referencing tools. Items may ask the student to describe steps in a construction, identify the next step in a given construction, or describe what construction is being created.

MA.912.GR.5	***Make formal geometric constructions with a variety of tools and methods.***
MA.912.GR.5.3	Construct the inscribed and circumscribed circles of a triangle.
Benchmark Clarifications	*Clarification 1:* Instruction includes using compass and straightedge, string, reflective devices, paper folding or dynamic geometric software.
Context	Mathematical
Calculator	Available
Assessment Limits	Items will assess constructions through the use of compass and straight-edge with descriptions, images, and/or animations. Items may ask the student to describe steps in a construction, identify the next step in a given construction, or describe what construction is being created. Items may not refer to the orthocenter. Items must use straightedge and compass vocabulary when referencing tools.

Measurement and Coordinate Geometry

MA.912.GR.3	***Use coordinate geometry to solve problems or prove relationships.***
MA.912.GR.3.2	Given a mathematical or real-world context, use coordinate geometry to classify or justify definitions, properties and theorems involving circles, triangles or quadrilaterals. *Example:* Given Triangle ABC has vertices located at $(-2, 2)$, $(3, 3)$ and $(1, -3)$, respectively, classify the type of triangle ABC. *Example:* If a square has a diagonal with vertices $(-1, 1)$ and $(-4, -3)$, find the coordinate values of the vertices of the other diagonal and show that the two diagonals are perpendicular.
Benchmark Clarifications	*Clarification 1:* Instruction includes using the distance or midpoint formulas and knowledge of slope to classify or justify definitions, properties and theorems.
Context	Both
Calculator	Available
Assessment Limits	N/A

MA.912.GR.3	***Use coordinate geometry to solve problems or prove relationships.***
MA.912.GR.3.3	Use coordinate geometry to solve mathematical and real-world geometric problems involving lines, circles, triangles and quadrilaterals. *Example*: The line $x + 2y = 10$ is tangent to a circle whose center is located at $(2, -1)$. Find the tangent point and a second tangent point of a line with the same slope as the given line. *Example*: Given $M(-4, 7)$ and $N(12, -1)$, find the coordinates of point P on $\overline{MN}$ so that P partitions $\overline{MN}$ in the ratio $2:3$.
Benchmark Clarifications	*Clarification 1:* Problems involving lines include the coordinates of a point on a line segment including the midpoint. *Clarification 2:* Problems involving circles include determining points on a given circle and finding tangent lines. *Clarification 3*: Problems involving triangles include median and centroid. *Clarification 4:* Problems involving quadrilaterals include using parallel and perpendicular slope criteria.
Also Assesses	
MA.912.GR.3.1	Determine the weighted average of two or more points on a line.
Benchmark Clarifications	*Clarification 1:* Instruction includes using a number line and determining how changing the weights moves the weighted average of points on the number line.
Context	Both
Calculator	Available
Assessment Limits	Items will not assess beyond the Benchmark Clarifications. Items assessing MA.912.GR.3.1 must use only two points and either reference or be presented on a number line. Items assessing MA.912.GR.3.1 should have weights that total to 1 using fractions or percentages. Items may not refer to the orthocenter.

MA.912.GR.3	***Use coordinate geometry to solve problems or prove relationships.***
MA.912.GR.3.4	Use coordinate geometry to solve mathematical and real-world problems on the coordinate plane involving perimeter or area of polygons. *Example:* A new community garden has four corners. Starting at the first corner and working counterclockwise, the second corner is 200 feet east, the third corner is 150 feet north of the second corner and the fourth corner is 100 feet west of the third corner. Represent the garden in the coordinate plane, and determine how much fence is needed for the perimeter of the garden and determine the total area of the garden.
Context	Both
Calculator	Available
Assessment Limits	Items will require the student to find the length of at least one side that is not parallel to an axis. Items may use population density in solving problems.

MA.912.GR.4	***Use geometric measurement and dimensions to solve problems.***
MA.912.GR.4.1	Identify the shapes of two-dimensional cross-sections of three-dimensional figures.
Benchmark Clarifications	*Clarification 1:* Instruction includes the use of manipulatives and models to visualize cross-sections. *Clarification 2:* Instruction focuses on cross-sections of right cylinders, right prisms, right pyramids and right cones that are parallel or perpendicular to the base.
Context	Both
Calculator	Available
Assessment Limits	Items are limited to the shapes and cross-sections listed in *Clarification 2*. Items can include composite shapes composed of figures listed in *Clarification 2*. Items must use bases that are either a rectangle or a regular polygon for right prisms and right pyramids. Items assessing a cross-section perpendicular to the base of a cone and not through the apex must use images for identifying the shape of the cross-section.

MA.912.GR.4	***Use geometric measurement and dimensions to solve problems.***
MA.912.GR.4.2	Identify three-dimensional objects generated by rotations of two-dimensional figures.
Benchmark Clarifications	*Clarification 1:* The axis of rotation must be within the same plane but outside of the given two-dimensional figure.
Context	Both
Calculator	Available
Assessment Limits	Items can include rotation about the side of the two-dimensional object. Items can include composite shapes.

MA.912.GR.4	***Use geometric measurement and dimensions to solve problems.***
MA.912.GR.4.4	Solve mathematical and real-world problems involving the area of two-dimensional figures. *Example*: A town has 23 city blocks, each of which has dimensions of 1 quarter mile by 1 quarter mile, and there are 4500 people in the town. What is the population density of the town?
Benchmark Clarifications	*Clarification 1*: Instruction includes concepts of population density based on area.
Context	Both
Calculator	Available
Assessment Limits	Items representing side lengths as expressions must result in a non-linear equation. Items with polygons should only include the radius and apothem or radius and side length.

MA.912.GR.4	***Use geometric measurement and dimensions to solve problems.***
MA.912.GR.4.5	Solve mathematical and real-world problems involving the volume of three-dimensional figures limited to cylinders, pyramids, prisms, cones and spheres. *Example*: A cylindrical swimming pool is filled with water and has a diameter of 10 feet and height of 4 feet. If water weighs 62.4 pounds per cubic foot, what is the total weight of the water in a full tank to the nearest pound?
Benchmark Clarifications	*Clarification 1*: Instruction includes concepts of density based on volume. *Clarification 2:* Instruction includes using Cavalieri's Principle to give informal arguments about the formulas for the volumes of right and non-right cylinders, pyramids, prisms and cones.
Context	Both
Calculator	Available
Assessment Limits	Items can include composite or oblique figures.

MA.912.GR.4	***Use geometric measurement and dimensions to solve problems.***
MA.912.GR.4.6	Solve mathematical and real-world problems involving the surface area of three-dimensional figures limited to cylinders, pyramids, prisms, cones and spheres.
Context	Both
Calculator	Available
Assessment Limits	Items can include composite figures. Items will not include oblique figures.

MA.912.GR.7	***Apply geometric and algebraic representations of conic sections.***
MA.912.GR.7.2	Given a mathematical or real-world context, derive and create the equation of a circle using key features.
Benchmark Clarifications	*Clarification 1:* Instruction includes using the Pythagorean Theorem and completing the square. *Clarification 2:* Within the Geometry course, key features are limited to the radius, diameter and the center.
Context	Both
Calculator	Available
Assessment Limits	Items must give a graph or key features.

MA.912.GR.7	***Apply geometric and algebraic representations of conic sections.***
MA.912.GR.7.3	Graph and solve mathematical and real-world problems that are modeled with an equation of a circle. Determine and interpret key features in terms of the context.
Benchmark Clarifications	*Clarification 1:* Key features are limited to domain, range, eccentricity, center and radius. *Clarification 2:* Instruction includes representing the domain and range with inequality notation, interval notation or set-builder notation. *Clarification 3:* Within the Geometry course, notations for domain and range are limited to inequality and set-builder.
Context	Both
Calculator	Available
Assessment Limits	Angle measures will be in degrees. Items will not assess eccentricity. Items must give the equation of the circle.

MA.912.T.1	***Define and use trigonometric ratios, identities or functions to solve problems.***
MA.912.T.1.2	Solve mathematical and real-world problems involving right triangles using trigonometric ratios and the Pythagorean Theorem.
Benchmark Clarifications	*Clarification 1:* Instruction includes procedural fluency with the relationships of side lengths in special right triangles having angle measures of $30°$-$60°$-$90°$ and $45°$-$45°$-$90°$.
Also Assesses	
MA.912.T.1.1	Define trigonometric ratios for acute angles in right triangles.
Benchmark Clarifications	*Clarification 1:* Instruction includes using the Pythagorean Theorem and using similar triangles to demonstrate that trigonometric ratios stay the same for similar right triangles. *Clarification 2:* Within the Geometry course, instruction includes using the coordinate plane to make connections to the unit circle. *Clarification 3:* Within the Geometry course, trigonometric ratios are limited to sine, cosine and tangent.
Context	Both
Calculator	Available
Assessment Limits	Items will not address connections to the unit circle. Angle measures will be in degrees.

Appendix A

B.E.S.T. Geometry EOC Mathematics Reference Sheet

Customary Conversions

1 foot = 12 inches
1 yard = 3 feet
1 mile = 5,280 feet
1 mile = 1,760 yards

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

1 pound = 16 ounces
1 ton = 2,000 pounds

Metric Conversions

1 meter = 100 centimeters
1 meter = 1000 millimeters
1 kilometer = 1000 meters

1 liter = 1000 milliliters

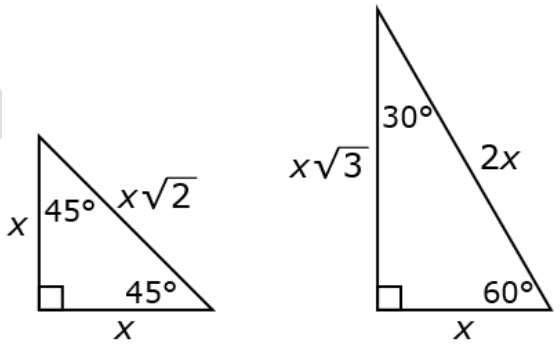
1 gram = 1000 milligrams
1 kilogram = 1000 grams

Time Conversions

1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours
1 year = 365 days
1 year = 52 weeks

Distance Formula	Midpoint Formula	Slope Formula
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	$(x_M, y_M) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$	$m = \frac{y_2 - y_1}{x_2 - x_1}$

Special Right Triangles



B.E.S.T. Geometry EOC Mathematics Reference Sheet

Formulas

Parallelogram	$A = bh$
Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$
Circle	$C = 2\pi r$ or $C = \pi d$ $A = \pi r^2$
Regular Polygon	$A = \frac{1}{2}Pa$
Prism/Cylinder	$SA = 2B + Ph$ $V = Bh$
Cone	$SA = B + \pi r h_s$ or $SA = B + \pi r l$ $V = \frac{1}{3}Bh$
Regular Pyramid	$SA = B + \frac{1}{2}Ph_s$ or $SA = B + \frac{1}{2}Pl$ $V = \frac{1}{3}Bh$
Sphere	$SA = 4\pi r^2$ $V = \frac{4}{3}\pi r^3$

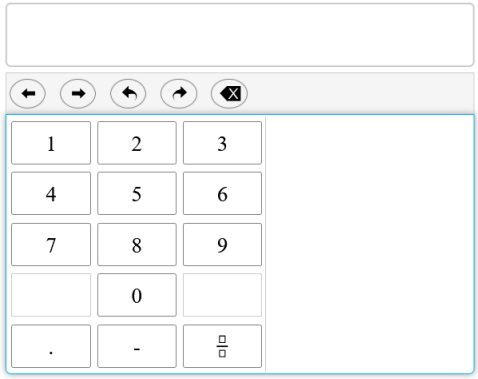
Key	
P = perimeter a = apothem h = height r = radius h_s = slant height l = slant height b = base d = diameter B = area of base	A = area C = circumference SA = surface area V = volume

Trigonometric Ratios		
$\sin\theta = \frac{opposite}{hypotenuse}$	$\cos\theta = \frac{adjacent}{hypotenuse}$	$\tan\theta = \frac{opposite}{adjacent}$

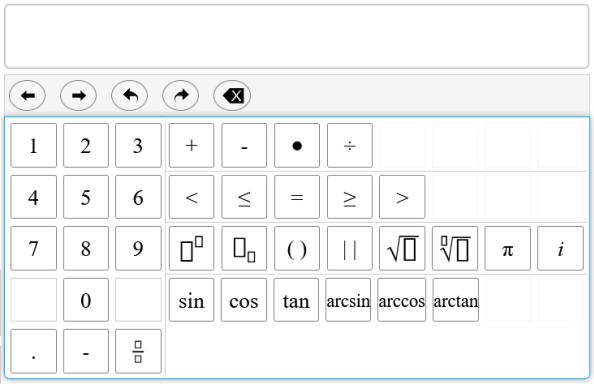
Appendix B

Keypads for Geometry Computer-Based Tests

Numeric Only



Full Keypad



Full Keypad with Variables:
Variables may change but the rest of the keys are always the same as the full keypad above.

Appendix C: Change Log

Page(s)	Change	Date
Global	Reordered benchmarks according to reporting categories	November 2022
20	Changed “Measurement and Geometry” to “Measurement and Coordinate Geometry”	November 2022
1	Added “AND REVIEWERS” after “ITEM WRITERS”	June 2023
3	Removed “of” after “select all” in the multi-select section.	June 2023
13	Corrected spelling of “assess” in assessment limits	June 2023
17	Added assessment limit to 912.GR.2.5: Items may include identifying coordinate pairs of vertices of transformed figures.	June 2023
18-19	Updated assessment limit of 912.GR.5 benchmarks: Items must use straightedge and compass vocabulary when referencing tools.	June 2023
19	Added assessment limit to 912.GR.5.3: Items may not refer to the orthocenter.	June 2023
19	Deleted assessment limit: There was a repeat assessment limit about straightedge and compass vocabulary.	June 2023
21	Added assessment limit to 912.GR.3.3: Items may not refer to the orthocenter.	June 2023
27	Corrected formatting so that each table aligns at the top	June 2023
28	Added “the” after “same as” in Full Keypad With Variables section. Added period to end of statement.	June 2023
3-4	Updated language to remove “scanned and scored electronically.”	August 2023